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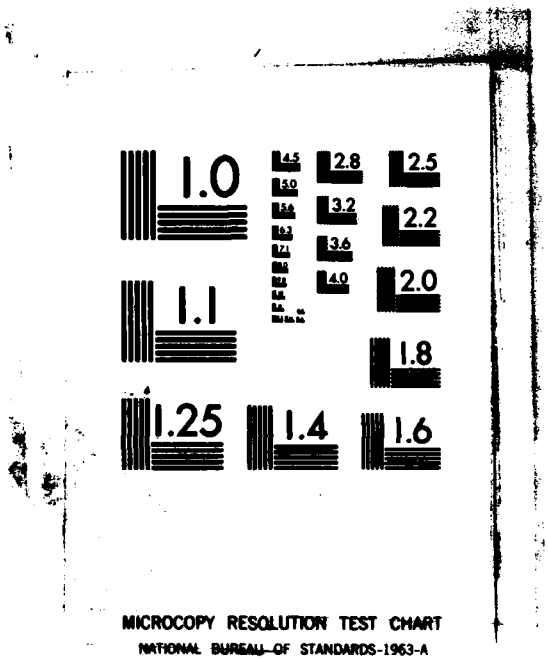
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HELICOPTER PILOT/COPILOT SURVIVAL SYSTEM

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JUNE 1983

PHASE REPORT

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The system described in this report is designed to provide the necessary survival capabilities to cover a wide range of emergencies when escaping from a downed helicopter. It is designed to provide armor protection, flotation capability, lift capability and use of survival items.

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INTRODUCTION

The Naval Air Development Center has developed three mission specific survival systems for Naval helicopter aircrewmen. These systems are categorized for use as: The stationary aircrewman, the mobile aircrewman and the passenger. The systems are designed to meet the diverse requirements of the aircrew, be fully compatible with in-flight duties and provide the equipment necessary to aid in survival and detection.

The Helicopter Pilot/Copilot Survival System described in this report is designed for pilots, copilots and other aircrewmen who perform similar functions as stationary aircrewmen. They require a survival system designed to provide the necessary survival capabilities to cover a wide range of emergencies when escaping from a downed helicopter. The Helicopter Pilot/Copilot Survival System, in accordance with the above requirement, was designed to be worn constantly during missions over land or water; and to provide armor protection, flotation capability, lift compatibility, and use of survival items. The system and its subsystems are compatible with current aircrew requirements and do not interfere with the standard duties of the wearer.

Between 1973 and 1975 several experimental models of this system were fabricated for the Naval Air Development Center (NADC). They were subjected to NADC's pool tests, static life tests, and a few life tests. Based on shortcomings uncovered by these tests, several new prototypes were fabricated and subjected to a series of tests between 1976 and 1977. The tests proved the validity of the new design.

PURPOSE

The purpose of this report is to document the development to-date, of this Helicopter Pilot/Copilot Survival System. Due to this system's present unfunded status, development has been curtailed. Upon resumption of development, this report will be utilized to assist those involved in future development of this system.

SYSTEM DESCRIPTION

The system consists of a vest-like garment made of Aramid cloth, developed to contain front and rear armor, a Mini-Raft, an LPU-21B/P Life Preserver and Survival Items. In addition, the vest contains a snap link hoist ring to provide lift capability to the wearer, from land or water; and to accommodate the above survival subsystems. The system is designed for the wearer's comfort, freedom of movement and ease of adjustment. Figure 1 is a front view drawing of the vest and Figure 2 is a picture of the rear view. Descriptions of the subsystems contained in this vest, are as follows:

. Front and Rear Armor. To ensure that the system would be compatible with the body armor, the front and rear armor plates were positioned ideally on the body and the system was built around it. The Navy will use the new, light weight, contoured plates being designed by the U.S. Army Research and Development Command, Natick, MA. The front armor plate is secured to the vest by double slide fastener,

protecting the user's frontal area; and the rear plate is held in the vest's rear pocket to protect the user's back. Both armor plates are optional.

·Mini-Raft. The Mini-Raft is a one man Life Raft fabricated from heat sealable polyrethane coated cloth composed of two inflatable cells. Its main or primary buoyancy is obtained by inflating the CO_2 Inflation Chamber by means of a 56 gram CO_2 bottle using a standard inflation assembly. Inflation of the raft is performed by pulling the inflation lanyard shown in Figure 1; and as the Mini-Raft expands, it opens a hook and pile closure allowing the Mini-Raft to deploy and the rear armor to fall away. Secondary buoyancy can be added by orally inflating the oral inflation chamber. The Mini-Raft is stowed in the vest's rear pocket and is tethered to the user's vest to avoid loss in water, when deployed.

·LPU-21B/P Life Preserver. The LPU-21B/P Life Preserver was selected because it can easily support the survivor with his armor in the water. It is attached to the vest and is inflated by manually activating two CO_2 cells with the beaded handle. The preserver is also highly compatible with the fixed crew stations of the pilot, copilot, or other aircrewmen.

·Survival Items. Survival Items consist of 1 Dye Marker, 1 Strobe Light, 1 Steady Burn Light, 2 MK-13 MOD 0 Day/Night Flares, 1 Small Signal Mirror, 1 Pengun Flare, 1 Whistle, 1 Four Ounce Water Bottle, 1 PRC-90 Radio, and 1 utility Knife. They are located in pockets on the frontal areas of the vest, within easy reach of the wearer.

·Snap Link Hoist Ring. The Snap Link Hoist Ring is securely sewn to the front of the vest, capable of supporting a 200 pound person while withstanding a 3G upward pull from a helicopter.

The vest serves as a platform for the various subsystems and determines the comfort properties. After the vest is donned, proper fit can be easily made by adjusting the side straps. This can be accomplished rapidly with one hand. This easy fitting feature provides improved comfort during operations and emergency lift. It also helps keep the armor secure to the body for proper protection and easier movement. Since the vest is open sided except for the adjusting straps, heat dissipation is enhanced. The Helicopter Pilot/Copilot Survival System is suitable for summer and winter wear.

SYSTEM CHARACTERISTICS

Characteristic	Threshold	Goal
Weight	Maximum system weight shall be less than 35 pounds.	30 pounds
Buoyancy	The inflated LPU-21B/P shall support a 200 pound person in full gear.	Same

Characteristic	Threshold	Goal
Hoisting Capability	This system's hoisting apparatus shall be capable of supporting a 200 pound person in full gear while withstanding a 3G upward pull from a helicopter.	Same
Deployment of the	30 seconds after CO_2 cell activation	20 seconds
Armor Plate Jettisoning	Back plate automatically jettisoned 10 seconds after activation of Mini-Raft CO_2 cell; front plate manually jettisoned in 10 seconds.	Back plate in 4 seconds; front plate in 4 seconds
System easily donned/ doffed	Donned in 30 seconds, doffed in 15 seconds	Donned in 10 seconds, doffed in 5 seconds
Adjustable for size	5th to 95th size percentile	Same
Body heat dissipation in Helicopter ambient of 90° - $100^{\circ}F$	Heat dissipation judged adequate by wearers	Same
Removal of back and front armor plates upon entering water	After entering water, back plate falls away by deployment of Mini-Raft within 10 seconds; Front Plate, 5 seconds manual removal time	Back plate, 4 seconds; Front plate, 4 seconds removal time
Inflation of Life Preserver to design shape	30 seconds after activation of CO_2 cells	8 seconds
Autorotation of unconscious survival by Life Preserver	5 seconds	1 second
Boarding of Mini-Raft with Life Preserver inflated	20 seconds	Same
Compatible for use in following aircraft	UH-1, AH-1, H-2, H-3, H-46, H-53, H-60	Same

CONCLUSIONS

The information documented in this report should be of assistance to those continuing with this system's development, and to those involved in related systems' developments.

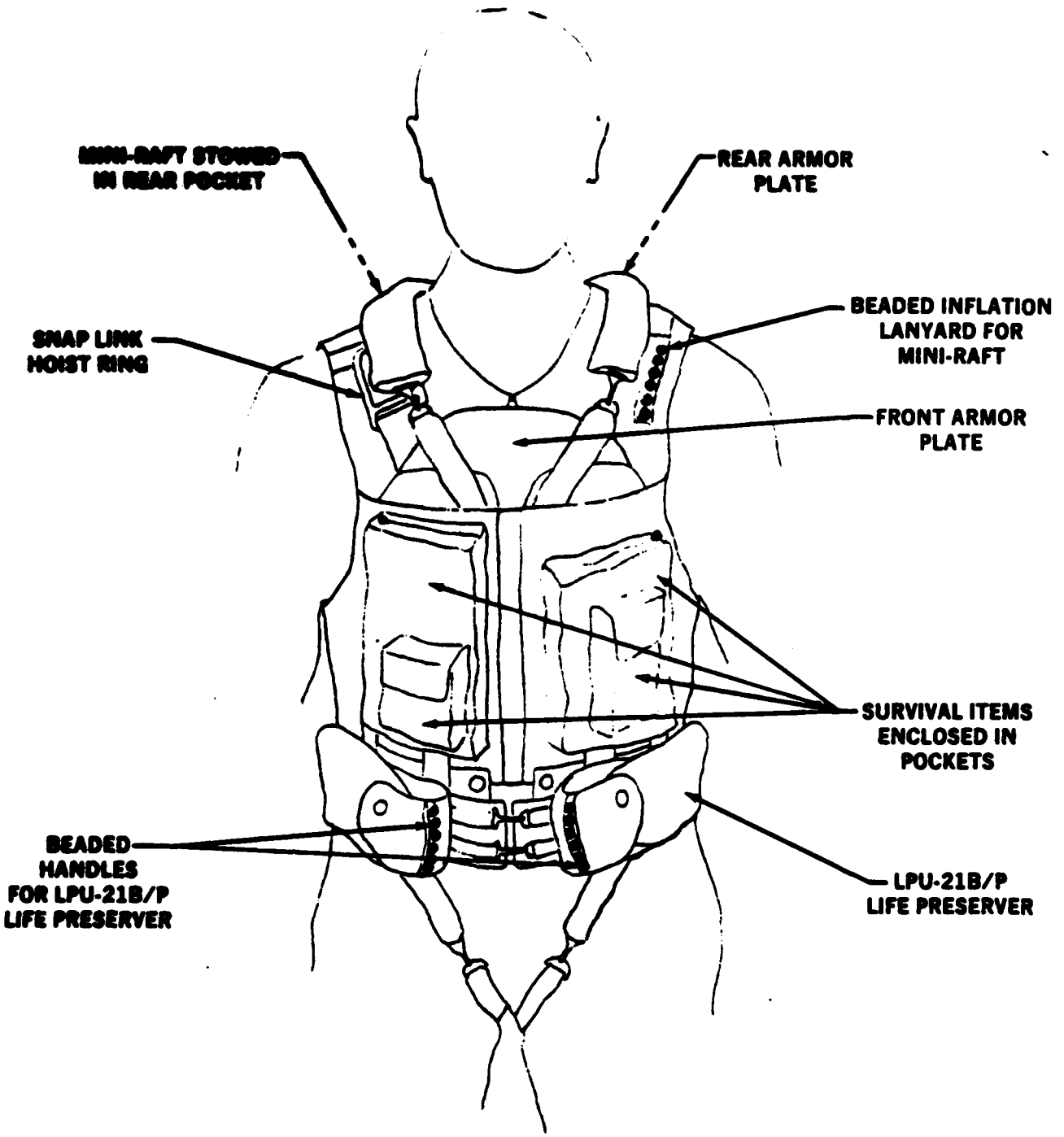


FIGURE 1. FRONT VIEW OF VEST

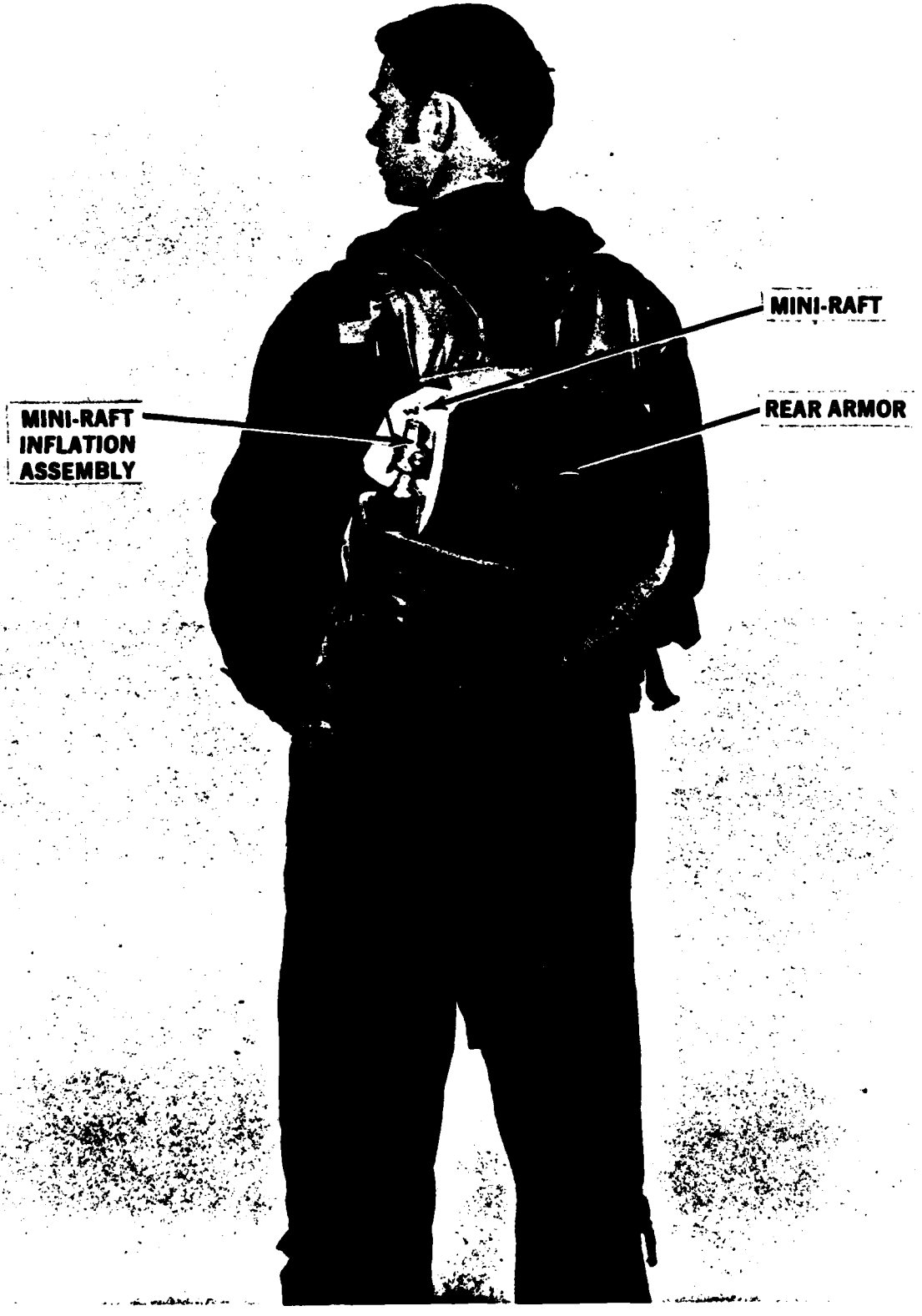
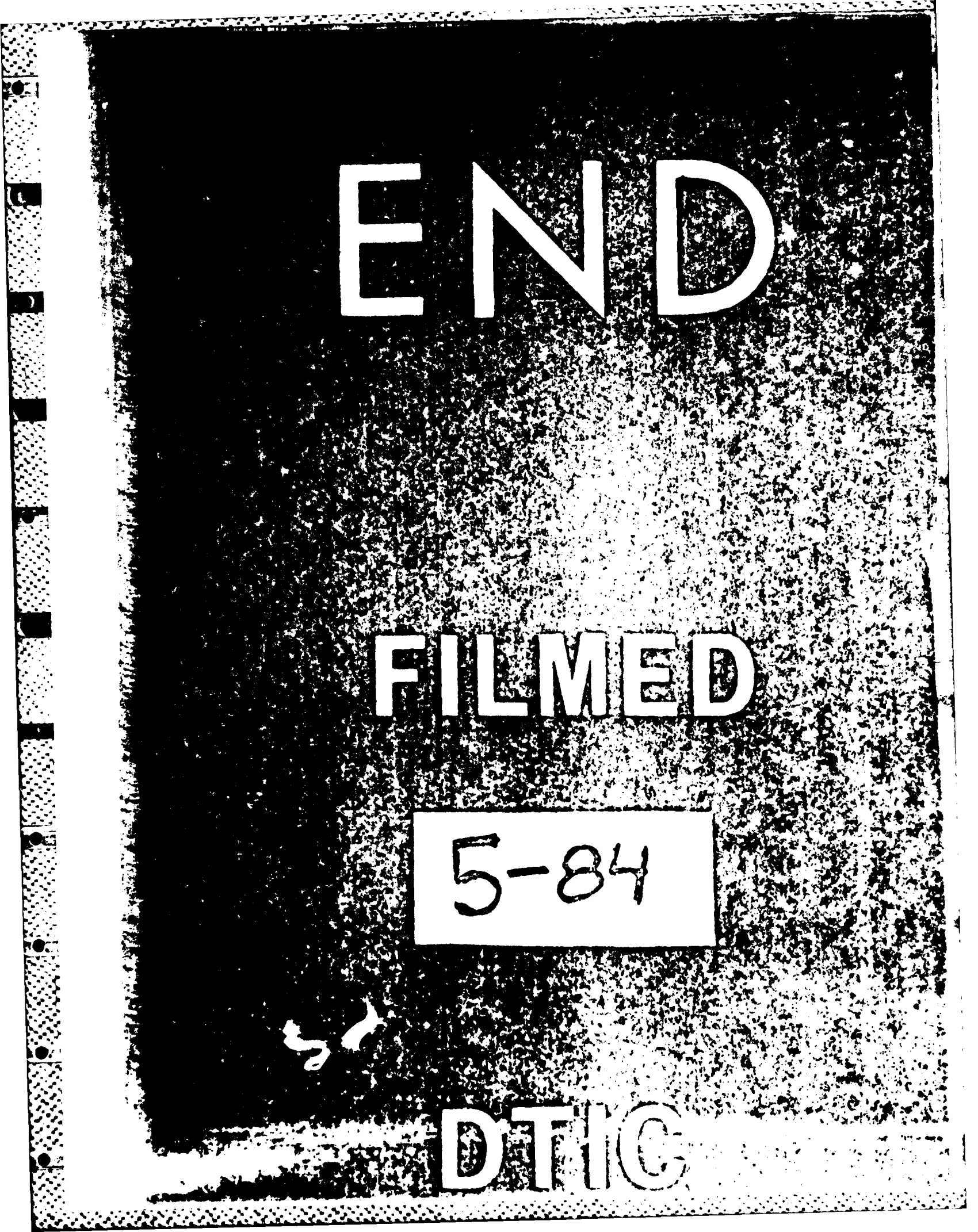


FIGURE 2. REAR VIEW OF VEST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